The impact of agile strategy on supply chain performance: The mediating role of supply chain practices and customer relationships in the retail sector in Jordan

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A B S T R A C T

This research examines the influence of an agile supply chain strategy (ASC) on supply chain performance (SCP) within Jordan's retail industry. The study focuses on the intermediary role of SCP. Data was gathered from senior and executive management personnel responsible for supply chain functions in 37 retail companies in Jordan. The collected data was analyzed using confirmatory factor analysis and structural equation modeling to assess the proposed model. The results indicate that SCP, specifically strategic partnerships with suppliers and customer relationships, act as mediators between the ASC strategy and supply chain performance. The study offers practical recommendations derived from the findings to assist retail sector managers. These findings contribute to the understanding of how an agile strategy can enhance supply chain performance in the Jordan retail sector.

1. Introduction

Supply chain flexibility is crucial for companies to meet customer demands, adapt to changing market conditions, and effectively manage fluctuations in demand and product life cycles (Blome et al., 2013). Customer satisfaction is also influenced by the ability of companies to swiftly address delivery requirements in terms of quantity and time (Gligor et al., 2015; Qi et al., 2011). To fulfill these requirements, companies need to focus on implementing agile strategies within their supply chains. An ASC strategy embodies supply chain agility, aiming to respond to evolving customer needs rapidly and effectively (Blome et al., 2013). While previous literature has mainly examined the relationship between ASC strategies and firm performance and product characteristics (Fisher, 1997; Goldsby et al., 2006), few studies have investigated how such strategies can enhance overall supply chain performance. Research by Cecere and Chase (2012) revealed that 89% of the companies surveyed recognized the significance of supply chain sourcing strategies, yet few fully understood how they could improve supply chain performance. The retail sector in the Hashemite Kingdom of Jordan holds a prominent position in the economy, contributing significantly to the gross domestic product. The sector's size has reached 4 billion dinars, with ambitions to reach 6 billion dinars by 2030, accounting for 15% of the GDP (Al-Iqtisadiah, 2020). However, the retail sector faces several challenges, particularly in supply chain management. Analytical studies have shown that food retail companies (the largest segment in the retail sector) in Jordan encounter inefficiencies within their supply chains. For instance, around 60% of food products are lost before reaching the consumers, with an additional 14% lost after arrival. Other challenges include inadequate logistics services, handling, and storage capacity, which have failed to keep pace with the sector's rapid growth. Population growth, accompanied by increased purchasing power and demand, has put pressure on the sector. Fluctuating food prices further add to the instability, along with shortages of certain products. Delayed shipments have also resulted in significant product damage. These challenges highlight the urgent need to implement alternative strategies to

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streamline supply chains, enhance responsiveness, improve logistics services efficiency, address market and price volatility, and cope with the pressures faced by the retail sector, including population growth and increased demand.

This study aims to demonstrate how a agile strategy can enhance supply chain performance within the retail sector of the Hashemite Kingdom of Jordan. To achieve this objective, the study will conduct a theoretical review of the relationship between agile strategies in supply chains and SCP. It will identify the critical factors of supply chain strategy and practices that influence supply chain performance in the retail sector of the Kingdom of Saudi Arabia. Additionally, the study will measure the mediating effect of variables on the relationship between agile strategy and supply chain performance. Finally, based on the study's findings, recommendations will be provided to decision-makers to guide their focus on the crucial factors determining SCP, thereby maximizing the value derived from agile strategies in retail supply chains in Jordan.

2. Literature review and hypothesis development

2.1 Literature review

The current competitive landscape and increasing environmental turbulence have led to a growing interest in the concept of "supply chain agility". However, there has been ongoing debate and speculation about what it truly means for an organization to be agile, as opposed to being efficient, effective, agile, customer-focused, value-adding, quality-driven, proactive, and so on. According to Naim et al. (1999), agile supply chain (ASC) refers to an organization's ability to gain a strategic advantage by enabling its supply chain processes to respond to marketplace uncertainties. ASC s have the capability to adapt quickly to unexpected events, changes in the market, and customer requirements (Nayyar & Bantel, 1994; Goldman et al., 1995). Agile strategy refers to an organization's ability to respond to market uncertainties, customer demands, and competitive changes quickly and effectively. It involves leveraging market knowledge, collaboration, and flexible processes to exploit profitable opportunities in a volatile marketplace. In the context of the supply chain (SC), agility signifies the capacity to adapt rapidly and diversely to unexpected events, market fluctuations, and evolving customer requirements. ASC s are characterized by their capability to detect and respond to disruptions, volatility, and uncertainties, ultimately enhancing their overall performance (Naylor et al., 1999; Khan et al., 2012).

SC performance encompasses multiple dimensions, including operational, financial, and customer-related indicators. It reflects the extent to which a SC can meet customer demands, deliver products promptly, achieve cost efficiencies, and improve overall customer satisfaction. Prior research has demonstrated that an efficient and effective SC is crucial for attaining competitive advantage and sustainable business performance (Fawcett et al., 2008; Li et al., 2005). The SC serves as an intermediary between the agile strategy and the overall SC performance, playing a critical role in translating strategic objectives into operational outcomes. SC practices, such as establishing strategic partnerships with suppliers and nurturing customer relationships, act as mediating mechanisms that enhance the impact of the agile strategy on SC performance (Li et al., 2005). Strategic partnerships with suppliers involve fostering close and long-term relationships, engaging in mutual planning, problem-solving, and continuous improvement programs. These initiatives enable improved coordination, flexibility, and responsiveness within the SC (Whitten et al., 2012). Customer relationships, on the other hand, encompass activities focused on cultivating and managing long-term connections with customers. This allows organizations to gain a deeper understanding of customer preferences, anticipate shifts in demand, and tailor products and services accordingly (Vickery et al., 2010).

2.2 Hypothesis development

The research model illustrates the hypothetical relationships between the ASC strategy and SCP (strategic partnership with suppliers and customer relationships), as well as the performance of the SC. It is assumed that SCP mediates the relationship between the agile strategy and SCP. The ASC strategy's impact on SCP is transmitted through the SCP. Specifically, the ASC influences SCP through strategic partnership with suppliers in several ways. Firstly, companies that establish strategic partnerships with suppliers can achieve integrated process links with their suppliers, enabling them to monitor initiatives such as idea exchange, identifying new market opportunities, developing greater knowledge of raw materials, and maintaining continuous improvement approaches with their suppliers (Saeed et al., 2011). Due to this depth and broader scope of supplier interactions, the company within the supply chain can coordinate and deal with competitive pressures and opportunities more flexibly and innovatively. Based on the above, the first research hypothesis can be formulated as follows:

H₁: *There is a direct positive influence of the ASC strategy on SCP in the retail sector in Jordan.*

Strategic partnership with suppliers allows suppliers to participate in activities throughout the product life cycle and provide inputs related to product design, materials, tools, and others at an early stage (Alrwashdeh et al., 2019; Tarigan & Siagian, 2021). This avoids delays due to changes, rework, and increases the speed at which these processes can be executed. Furthermore, there is more frequent information exchange with suppliers (Liu et al., 2013). Moreover, with increased opportunities for integration and information sharing among supply chain parties, trust and collaboration are enhanced, leading to joint decision-making and the establishment of shared design and program initiatives. The activities provided by strategic partnership with suppliers contribute to enhancing the supply chain partners' ability to, the second hypothesis can be proposed:

H₂: *Strategic partnership with suppliers mediates the relationship between the ASC strategy and SCP.*

Customer relationships mediate the positive impact of the ASC strategy on SCP in various ways. A close relationship with customers improves information sharing about how the company identifies and meets customer requirements (Droge et al., 2012). The third hypothesis can be formulated as follows:

H₃: *Customer relationships mediate the relationship between the ASC strategy and SCP.*

Numerous studies have indicated the positive impact of SCP (strategic partnership with suppliers and customer relationships) on SCP. For instance, a study by Liu et al. (2016) highlighted that building close and long-term relationships between the organization and its suppliers directly and positively affect SCP by enabling the delivery of improved products with the appropriate variety and quantity. It also allows for the capacity to adjust production speed in response to customer demand changes. Additionally, a study by Vickery et al. (2010) demonstrated that close and long-term relationships with customers lead to improved customer satisfaction, the ability to handle difficult and non-routine orders, and the ability to fulfill customer requirements according to their preferences. Based on the above, the fourth and fifth hypotheses can be formulated as follows:

H₄: *Strategic partnership with suppliers has a direct positive influence on SCP in the retail sector in Jordan.*

H₅: *Customer relationships have a direct positive influence on SCP in the retail sector in Jordan.*
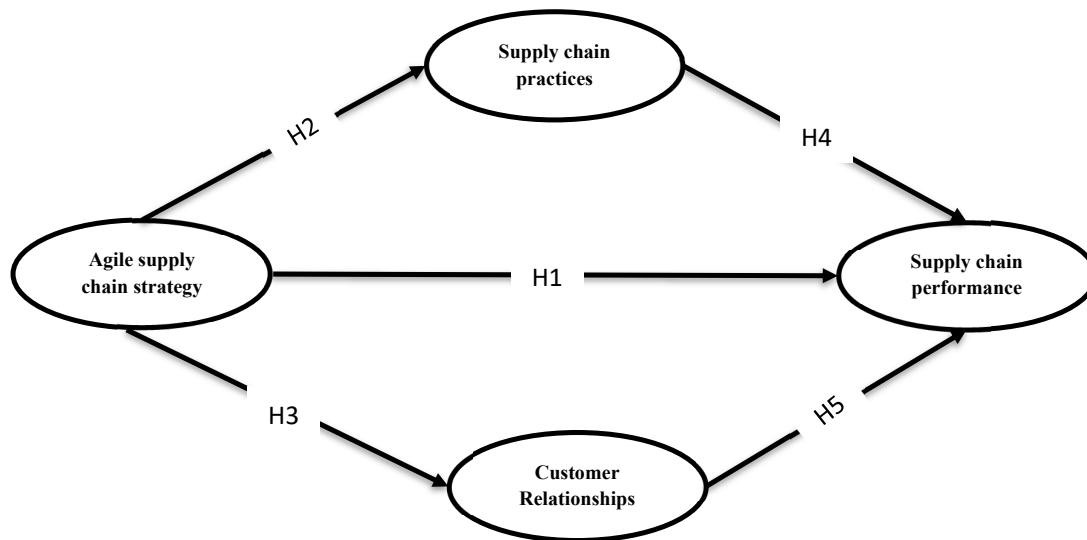

Fig. 1. The proposed study of this paper

3. Methods

In this study, a series of steps were followed, including the design of a questionnaire and data collection. A measurement model was created using confirmatory factor analysis to ensure the study's validity and reliability. A Structural Model was then developed, and hypotheses were tested. The findings were extensively discussed, and a summary along with recommendations for future research were provided. To construct the questionnaire, previous studies by Li et al. (2005), Qi et al. (2011), and Huang et al. (2002) were consulted. The questionnaire items focused on SCP, such as strategic partnerships with suppliers and customer relationships, as well as performance and ASC strategies. A 5-point Likert scale was used to assess the items. The questionnaire was adapted to fit the Saudi Arabian context and reviewed by practitioners and academics for validation. Data was collected from 350 supply chain practitioners in retail companies across multiple cities. The sample consisted of managers, deputy managers, and senior managers from various departments involved in supply chain management. A total of 134 questionnaires were completed, representing a response rate of 38%. After excluding incomplete and outlier questionnaires, 118 valid cases remained for data analysis. Although the response rate was relatively low, the strategic nature of the study allows for reliable results. Despite the small sample size, the study population's composition of individuals in higher positions enhances the validity of the findings.

In conclusion, the study followed a systematic approach, encompassing questionnaire design, data collection, model construction, and hypothesis testing. The results were thoroughly discussed, and recommendations were provided for future research. Despite limitations such as the small sample size and response rate, the study's outcomes can still be considered reliable due to the study's strategic focus.

4. Result

Confirmatory factor analysis (CFA) was utilized to establish the validity and reliability of the Measurement Model. The study examined both convergent validity and discriminant validity for each construct to confirm their validity. Additionally, the model fit indices were assessed to evaluate the overall fit of the model. The CFA analysis confirmed the convergent validity and discriminant validity of each construct. However, one item related to measuring SCP (SCP5) was removed from the analysis due to a low loading factor. Its inclusion would have negatively impacted the model's goodness of fit. Following the exclusion of SCP5, the model fit indices were as follows: $\chi 2/df = 1.301$ (P = 0.024), GFI = 0.886, CFI = 0.95, AGFI = 0.842, and RMSEA = 0.051. These indices indicate an acceptable level of model fit. It is important to note that these values represent specific fit indices commonly employed in CFA. The $\chi 2/df$ ratio measures the relative fit of the model, with lower values suggesting a better fit. GFI, CFI, and AGFI are goodness-of-fit indices, where higher values indicate better fit. RMSEA represents the root mean square error of approximation, and lower values suggest better fit.
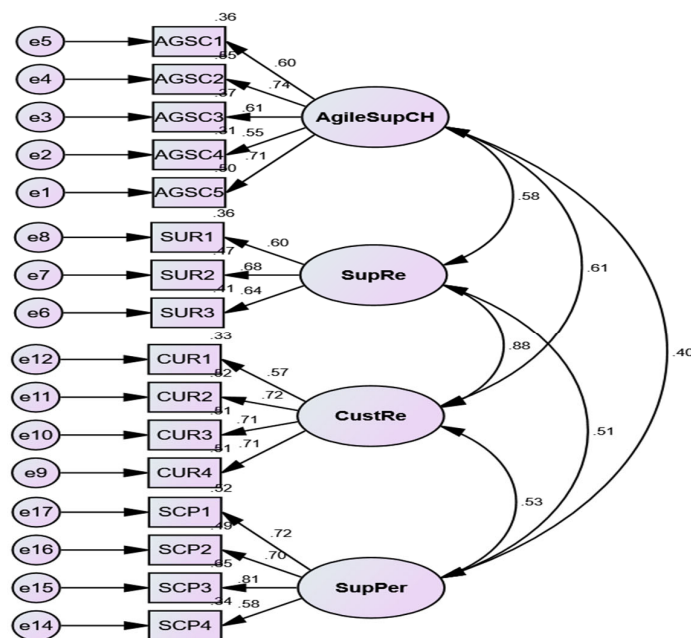

Fig. 2. Measurement Model

The findings suggest that the measurement model used in the study aligns well with the data collected from the retail sector in Jordan, as reported by Hair et al. (2013). Moreover, all the remaining item loadings in the model are above the acceptable threshold of 0.50, indicating their statistical significance and suitability for measuring their respective factors according to Hair et al. (2013). The loadings that exceed 0.50 and are statistically significant also provide evidence of convergent validity, as these items align with their underlying constructs and effectively measure the intended factors.

Table 1 displays the results of the confirmatory factor analysis, presenting the factor loadings and their statistical significance. To assess the reliability of the measurement model, several measures were calculated, including Cronbach's alpha coefficient, composite reliability, and average variance extracted. Cronbach's alpha, which assesses the internal consistency of the items within each variable, exceeded the recommended threshold of 0.70 for all variables. Composite reliability, which indicates the internal consistency and coherence among the latent variables, also surpassed the acceptable threshold of 0.70, indicating the stability and consistency of the measurement model, as discussed by Hair et al. (2013). Additionally, average variance extracted was calculated to determine the amount of variance explained by the questionnaire items for each variable. Consistent with Hair et al. (2013), average variance extracted values should exceed 0.50 for each variable to demonstrate the stability of the scale. The formula introduced by Hair et al. (2003) was utilized to calculate the values of composite reliability and average variance extracted.

Table 1
Results of the confirmatory factor analysis

Construct	CR	AVE	Cronbach's Alpha (0.867)
ASC	0.77	0.517	0.787
SCP	0.758	0.513	0.86
CRM	0.716	0.566	0.778
SCP	0.798	0.512	0.782

Note: CR= Critical Ratio, AVE= Average Variance Extracted

To assess the discriminant validity of the measurement model, both the correlation matrix among the variables in the model and the average variance extracted were examined. According to Chin (1998), it is expected that the average variance extracted values should be higher than the correlations between variables in the measurement model. Table 2 illustrates that the average variance extracted values exceeded the correlations between the variables, indicating that the variables in the measurement model are distinct from one another and there is adequate discriminant validity.

Table 2
Discriminant validity indicators (correlation coefficient and SQRT (AVE))

	ASC	SCP	CRM	SCP
ASC	0.719			
SCP	0.433	0.716		
CRM	0.409	0.233	0.752	
SCP	0.344	0.427	0.326	0.715

5. Hypothesis Test

The Structural Equation Modeling (SEM) technique was employed using the AMOS 22 software to estimate the direct and indirect relationships within the structural model. The analysis of the model demonstrated a good fit with the data sample collected from the study population, as indicated by satisfactory model fit indices as follows:

χ^2/df= 1.562 (P=0.000); GFI=.877; CFI = .901; AGFI = .825; RMSEA= .068, indicating an acceptable fit of the model to the data.

Table 3
Standardized Regression Weights

Hypothesis			Estimate	S.E.	C.R.	P
ASC	—	SCP	0.689	0.149	4.258	***
ASC	—	CRM	0.692	0.138	4.891	***
ASC	—	SCP	0.063	0.112	0.271	0.786
CRM	—	SCP	0.354	0.089	1.954	0.051
SCP	—	SCP	0.198	0.097	1.062	0.288

*S.E: Standard Error, C.R: Critical Ratio (t-value), P: Probability, *** Significant ant P≤0.01*
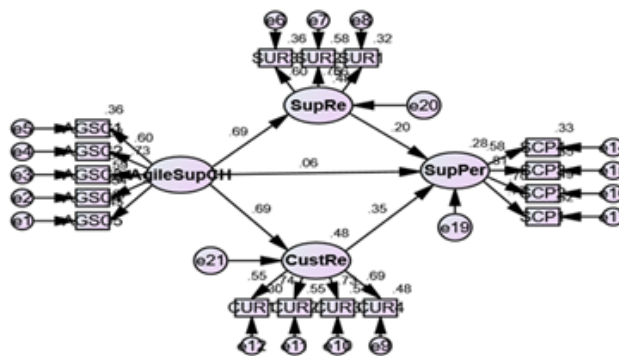

Fig. 3. Structural model

The findings in Table 3 display the results of the direct effect analysis, also known as path analysis. It indicates that the impact of the ASC on supplier relationships is statistically significant, as evidenced by a significant beta value of 0.689. Similarly, the effect of the ASC on customer relationships is also statistically significant, with a beta value of 0.692 and a significance

level of 0.000. However, no statistically significant direct effects were observed for the other paths, suggesting that those paths do not have a direct impact.

According to Baron and Kenny (1986), there are three conditions for a variable to be considered a mediator, indicating its role in mediating the relationship between the independent and dependent variables. These conditions are significant influence of the independent variable on the mediator, significant influence of the independent variable on the dependent variable in the absence of the mediator, and a reduction in the direct effect of the independent variable on the dependent variable when the mediator is included in the model.

Table 3 demonstrates that the independent variable, ASC strategy, does not have a significant direct effect on SCP, as indicated by the non-significant beta value of 0.063. However, there is a significant influence of the ASC strategy on SCP, specifically strategic partnership with suppliers (beta = 0.689) and customer relationships (beta = 0.692). The total effect of the ASC strategy on SCP, mediated by strategic partnership with suppliers, was determined to be 0.136 using the Sobel Test, which is higher than the direct effect of the independent variable (0.063). This suggests that strategic partnership with suppliers acts as a mediator between the ASC strategy and SCP. Similarly, the total effect of the ASC strategy on SCP, mediated by customer relationships, was found to be 0.245 using the Sobel Test, surpassing the direct effect of the independent variable (0.063).

6. Discussion

The success of a company within the supply chain depends on its ability to swiftly adjust its production, manufacturing, and sales activities in response to the agility of its supply chain, which enables it to adapt to changing factors such as delivery quantities and schedules. The concept of an ASC represents the company's capacity to quickly modify its tactics and operations, allowing it to effectively adapt to various products and sudden changes in product volume, as well as to sense and respond to evolving market demands (Gligor et al., 2015). Consequently, this study makes a valuable contribution by providing a conceptual framework that sheds light on the impact of an ASC on performance and offers insights into how companies can effectively develop and implement strategies in the face of fluctuating demand, dynamic markets, and short product life cycles. Although there has been limited experimental research on the effect of ASC strategy on SCP, this study elucidates how the presence of SCP can influence the positive relationship between an ASC strategy and SCP, thereby adding to the existing body of research aimed at understanding how companies can successfully navigate a rapidly changing market. The theoretical significance of this study lies in aligning ASC strategy with SCP in the retail sector of Jordan, providing valuable insights into enhancing chain performance through the mediating effect of these practices.

The study findings highlight the crucial role of an ASC strategy in improving SCP. The strategy positively contributes to enhancing strategic partnerships with suppliers and strengthening the company's relationships with its suppliers, fostering the desired level of interaction that enhances overall chain performance. Furthermore, the study reveals a strong relationship between ASC strategy and customer relationships, emphasizing the need for an agile strategy to effectively improve these practices. The presence of a strategic partnership with suppliers is essential in establishing a positive relationship between agile strategy and SCP, as hypothesized. Similarly, the relationship with customers also mediates this effect, aligning with the findings of Hazen et al. (2015). However, in terms of the fourth and fifth hypotheses related to the impact of SCP on performance, the study finds that these practices do not have a significant effect on SCP. This suggests that the retail sector should adopt ASC strategies to support its practices within the chain, enhance strategic partnerships with suppliers and customers, as recommended by various studies, and leverage SCP as complements to the ASC strategy to achieve improved performance.

The study results hold implications and practical applications for SCP that support the implementation of an ASC strategy. These practices play a crucial role in linking performance with the agile strategy. Given the demonstrated significance of these practices, it is essential to develop and strengthen them within supply chains that embrace agile strategies. Consequently, based on these findings, the study recommends that supply chains in the retail sector of Jordan adopt the study model to enhance their overall performance by prioritizing strategic partnerships with suppliers and customer relationships as complementary practices to the ASC strategy.

7. Recommendations, limitations and conclusion

The analysis of the study model using structural equation modeling has revealed that the influence of ASC strategy on SCP was weak and statistically insignificant. However, the findings emphasized the significance of integrating SCP, particularly strategic partnership with suppliers and customer relationships, as mediating factors to enhance the impact of agile strategy on performance. The researcher incorporated various studies to assess these relationships and ensured that the measurement tools were appropriately adapted to suit the retail sector in Jordan, focusing on measurement instrument validity and reliability.

Several limitations were identified in this study. Firstly, the research was confined to the retail sector in Jordan, which limits the generalizability of the findings. Future studies should consider examining other sectors that hold significant importance in the national economy, such as manufacturing and processing industries, to enable meaningful comparisons. Secondly, the

study was exclusively conducted in Jordan, highlighting the need for similar research in other countries due to variations in market characteristics, consumer behavior, and supplier dynamics. Another limitation is that the surveyed companies primarily consisted of large organizations with over 10 years of establishment. While this criterion may be crucial for achieving a certain level of supply chain practice maturity, it raises questions about whether the results would differ for start-up companies or less complex supply chains.

Although this study focused on strategic partnership with suppliers and customer relationships as two important aspects of SCP, there are other practices that can significantly impact SCP, such as postponement practices and just-in-time delivery. Therefore, it is recommended that future research expands the proposed model to include additional practices.

In conclusion, this study addressed a gap in the existing theoretical literature by examining how and why ASC strategy can enhance SCP through an integrated perspective, where specific SCP act as positive mediators. This highlights the need to further explore and understand the relationship between agile strategy, various SCP, and their combined impact on performance.

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